



THE UNIVERSITY OF WINNIPEG

APPLIED COMPUTER SCIENCE

Course Number: ACS-2947-001, 070L, 071L
Course Name: Data Structures and Algorithms
Course Webpage: <http://courses.acs.uwinnipeg.ca/2947-001/>

1 Instructor Information

Instructors: William Gidzak
Jeanette Bautista (as of October 17, 2019)

E-mail: je.bautista@acs.uwinnipeg.ca

Office Hours: Thursdays 11:00 am-12:00 pm Office: 3D25

Class meeting time: Mon/Wed 1:00-2:15 pm Room: 3D01
Lab time: L-070 Fridays 1:30-2:45 pm Room: 3D03
L-071 Fridays 2:45-4:00 pm Room: 3D03

2 Important Dates

1. First Class: Wednesday, September 4, 2019
2. First Lab: Friday, September 13, 2019
3. Midterm Test 1: Wednesday, October 2
4. Reading Week (no classes): October 13-19, 2019
5. Midterm Test 2: Wednesday, November 6, 2019
6. Final Withdrawal Date w/o academic penalty*: Tuesday, November 12, 2019
7. Last Class: Tuesday, December 3, 2019
8. Last Lab: Friday, November 29, 2019
9. Final Exam (Comprehensive): Saturday, December 7, 2019
10. University closures: Thanksgiving Monday, October 14, 2019
Remembrance Day Monday, November 11, 2019
11. Make-up day for Remembrance Day Tuesday, December 3, 2019

*A minimum of 20% of the work on which the final grade is based on will be evaluated and available to the student before the voluntary withdrawal date.

3 Course Objectives / Learning Outcomes

This course introduces the theory, practice and methods of data structures and algorithm design. Students will learn elementary data structures such as stacks, queues, linked lists, sequences, trees and graphs in Java language, and the algorithms designed for manipulating these data structures.

The objective of this course is to introduce students to both data structures and algorithm design. The goal of the lecture is twofold: 1) to discuss different data structures to represent real world problems and, 2) to study various ways to design algorithms to solve the problems. As an important part of the course, the Java programs that implement all the algorithms discussed will be analyzed and compared to develop deep knowledge on programming.

4 Evaluation Criteria

1. Labs (5%)
 - 6-8 labs (evenly weighted, lowest mark dropped)
 - No late lab submissions accepted
2. Assignments (20%)
 - 4 assignments, worth 5% each
 - Assignments will be accepted up to 1 day late with a 20% penalty

Course IDE:

Students are free to use any IDE that they choose. BlueJ, NetBeans, IntelliJ and Eclipse are available in the ACS labs.

Lab/assignment submissions:

All work is to be submitted electronically via Nexus. Further details and submission procedure will be stated in each assignment.

Students are responsible for backing up and protecting their lab and assignment work.

3. Midterm Tests (30%)
 - During regular class time on October 2 and November 6 (15% each)
4. Final Exam (45%)
 - Cumulative
 - 3 hours in duration
 - Should illness prevent participation in a test or examination, a medical certificate from a certified physician must be supplied before any adjustments are considered.

Students should contact the instructor as soon as possible if extenuating circumstances require missing a lab, assignment, test or examination. A medical certificate from a practicing physician may be required before any adjustments are considered.

5 Test / Exam Requirements

- Photo ID is required for the final exam.
- The use of computers, calculators, phones, or other electronic devices is not permitted on exams.
- Midterm and final exams are closed book.

6 Final Letter Grade Assignment

Historically, numerical percentages have been converted to letter grades using the following scale. However, instructors can deviate from these values based on pedagogical nuances of a particular class, and final grades are subject to approval by the Department Review Committee.

A+	90 – 100%	B+	75 – 79%	C	60 – 64%
A	85 – 89 %	B	70 – 74%	D	50 – 59%
A-	80 – 84%	C+	65 – 69%	F	below 50%

7 Required Text Book / Reading List

- M. T. Goodrich and R. Tamassia: *Data Structures and Algorithm in Java* (6th Edition), John Wiley & Sons, Inc., (ISBN 1118771338).
- Class Notes will be available at <http://courses.acs.uwinnipeg.ca/2947-001/> and via Nexus.

8 Prerequisite Information

- A grade of at least C in ACS-1904/3 or ACS-1905/3

9 Services for Students

Students with documented disabilities, temporary or chronic medical conditions, requiring academic accommodations for tests/exams (e.g., private space) or during lectures/laboratories (e.g., note-takers) are encouraged to contact Accessibility Services (AS) at 204-786-9771 or accessibilityservices@uwinnipeg.ca to discuss appropriate options. All information about a student's disability or medical condition remains confidential.
<https://www.uwinnipeg.ca/accessibility-services>.

Students may choose not to attend classes or write examinations on holy days of their religion, but they must notify their instructors at least two weeks in advance. Instructors will then provide opportunity for students to make up work examinations without penalty. A list of religious holidays can be found in the 2019-20 Undergraduate Academic Calendar online at <http://uwinnipeg.ca/academics/calendar/docs/important-notes.pdf>

All students, faculty and staff have the right to participate, learn, and work in an environment that is free of harassment and discrimination. The UW Respectful Working and Learning Environment Policy may be found online at <https://www.uwinnipeg.ca/respect>.

10 Misuse of Computer Facilities, Plagiarism, and Cheating

Academic dishonesty is a very serious offense and will be dealt in accordance with the University's policies.

Avoiding Academic Misconduct and Non-academic Misconduct. Students are encouraged to familiarize themselves with the Academic Regulations and Policies found in the University Academic Calendar at:

<https://uwinnipeg.ca/academics/calendar/docs/regulationsandpolicies.pdf>

Particular attention should be given to subsections 8 (Student Discipline), 9 (Senate Appeals) and 10 (Grade Appeals). Please note, in particular, the subsection of Student Discipline pertaining to plagiarism and other forms of cheating.

Detailed information can be found at the following:

- Academic Misconduct Policy and Procedures: <https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-policy.pdf> and <https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-procedures.pdf>
- Non-Academic Misconduct Policy and Procedures: <https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-policy.pdf> and <https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-procedures.pdf>

Misuse of Filesharing Sites. Uploading essays and other assignments to essay vendor or trader sites (filesharing sites that are known providers of essays for use by others who submit them to instructors as their own work) involves "aiding and abetting" plagiarism. Students who do this can be charged with Academic Misconduct.

Avoiding Copyright Violation. Course materials are owned by the instructor who developed them. Examples of such materials are course outlines, assignment descriptions, lecture notes, test questions, and presentation slides. Students who upload these materials to filesharing sites, or

in any other way share these materials with others outside the class without prior permission of the instructor/presenter, are in violation of copyright law and University policy. Students must also seek prior permission of the instructor /presenter before photographing or recording slides, presentations, lectures, and notes on the board.

11 Class Cancellation, Correspondence with Students and Withdrawing from Course

When it is necessary to cancel a class due to exceptional circumstances, the course instructor will make every effort to inform students via uwinnipeg email (and/or using the preferred form of communication, as designated in this outline), as well as the Departmental Assistant and Chair/Dean so that class cancellation forms can be posted outside classrooms.

Students are reminded that they have a responsibility to regularly check their uwinnipeg e-mail addresses to ensure timely receipt of correspondence from the University and/or the course instructor.

Please let course instructor know if you plan to withdraw from the course. Note that withdrawing before the VW date does not necessarily result in a fee refund.

12 Topics to be covered (tentative)

- Object-oriented design
- Arrays
- Linked lists
- Asymptotic analysis
- Recursion
- Stacks
- Queues
- Deques
- Array lists
- Positional lists
- Iterators
- Trees
- Binary trees
- Priority queues
- Heaps
- Maps
- Hash tables
- Sorting

Time permitting:

- Graphs
- Search trees